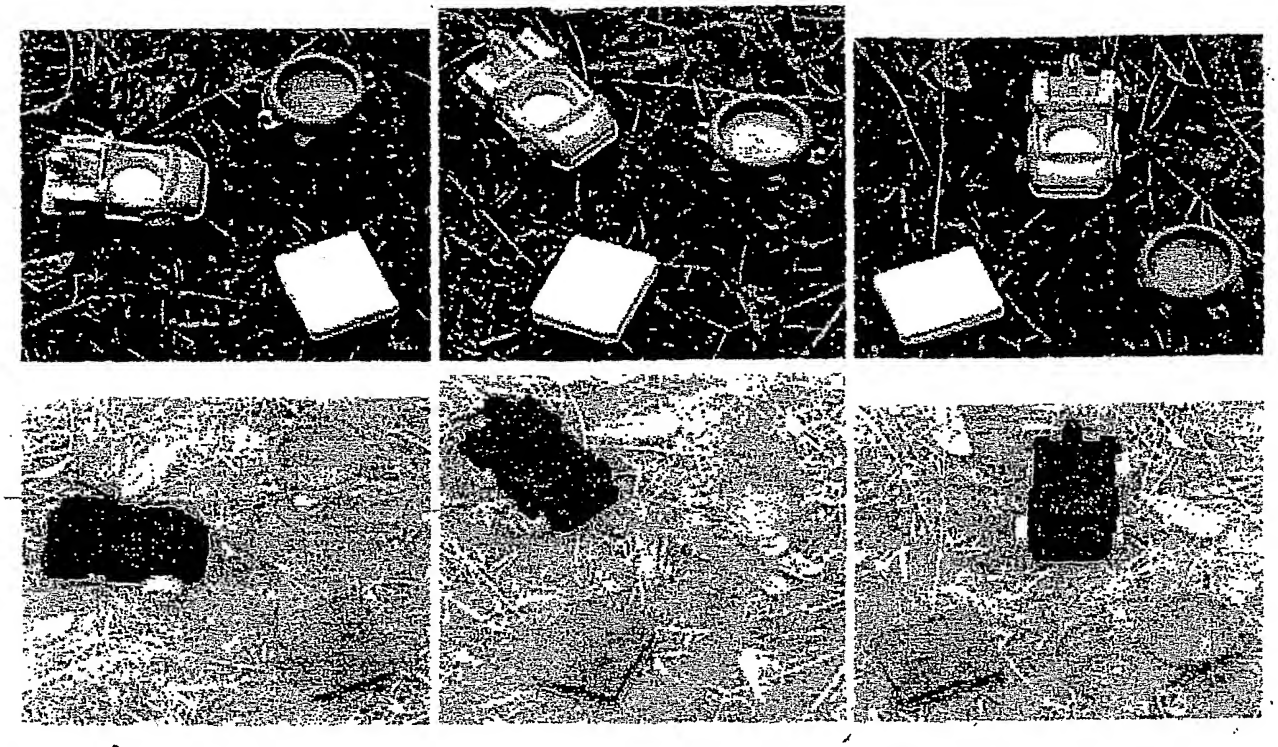


Figure 1 Original images separated by a 3D rotation of 45° and 90° (top) and matching results (bottom), displayed in same colors).

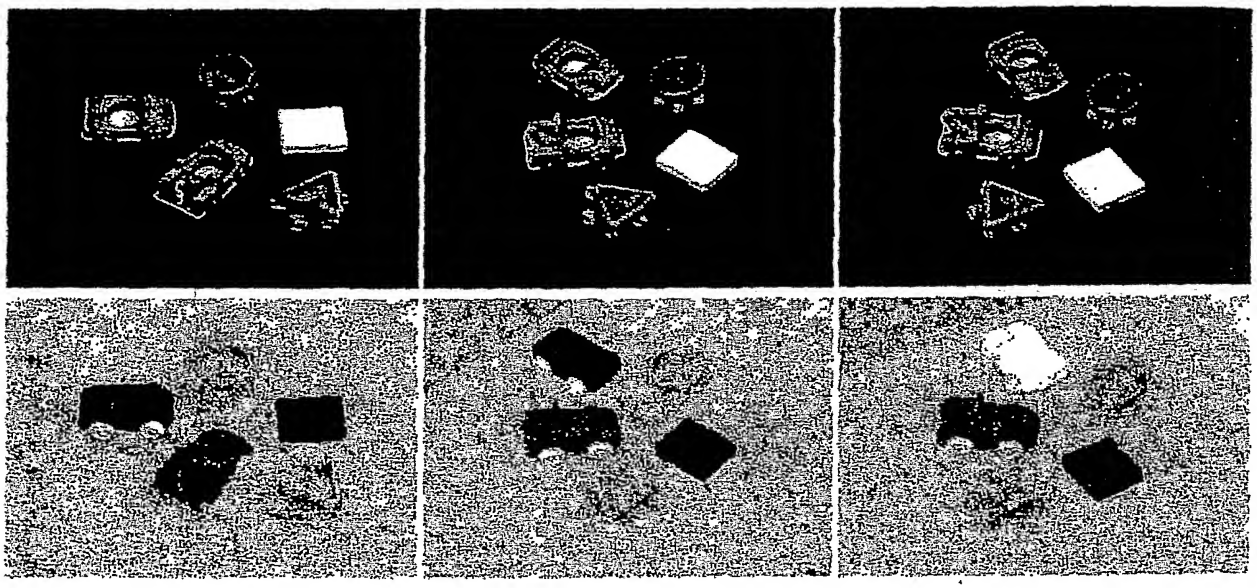


Figure 2 Original images separated by a 3D rotation of 45° and 60° (top) and matching results (bottom).

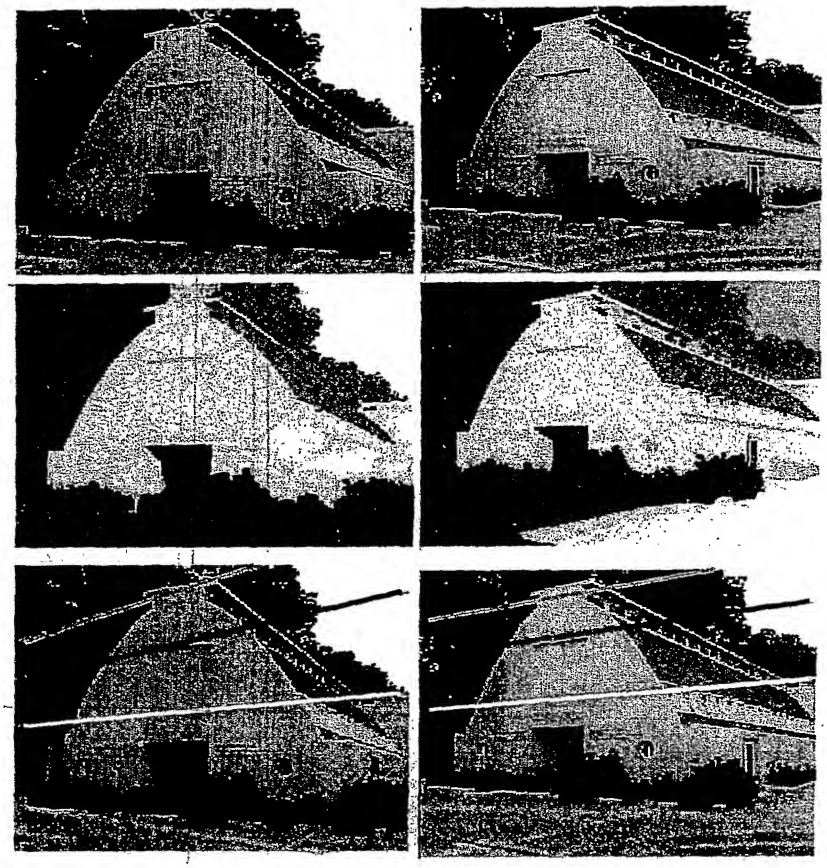


Figure 3: Original images (top), matched aggregates (middle) and epipolar lines (bottom).

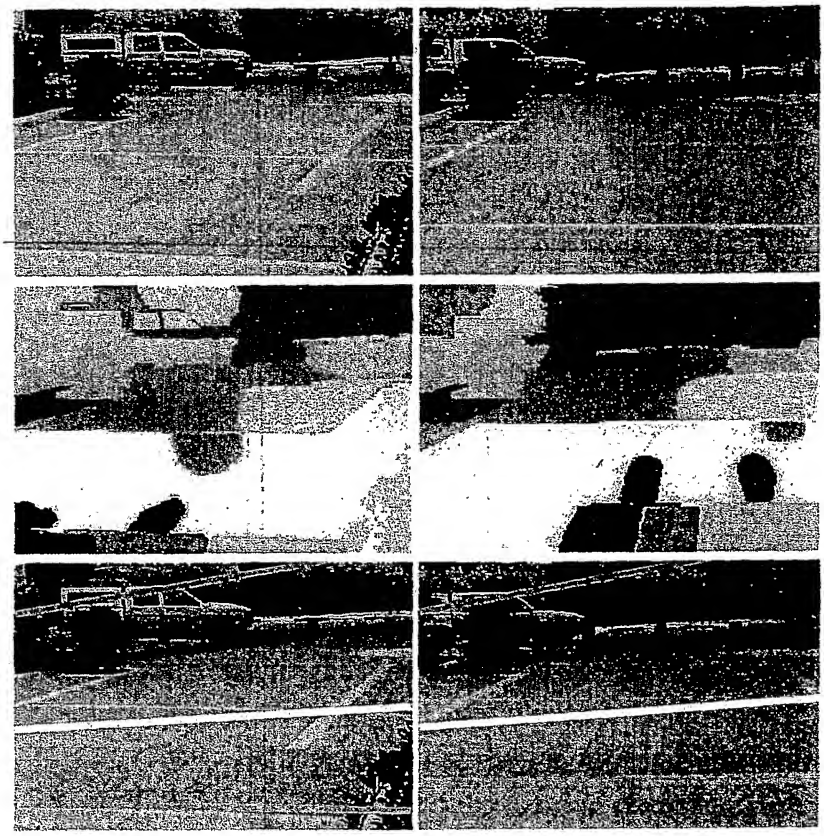


Figure 4 Original images (top), matched aggregates (middle) and epipolar lines (bottom).

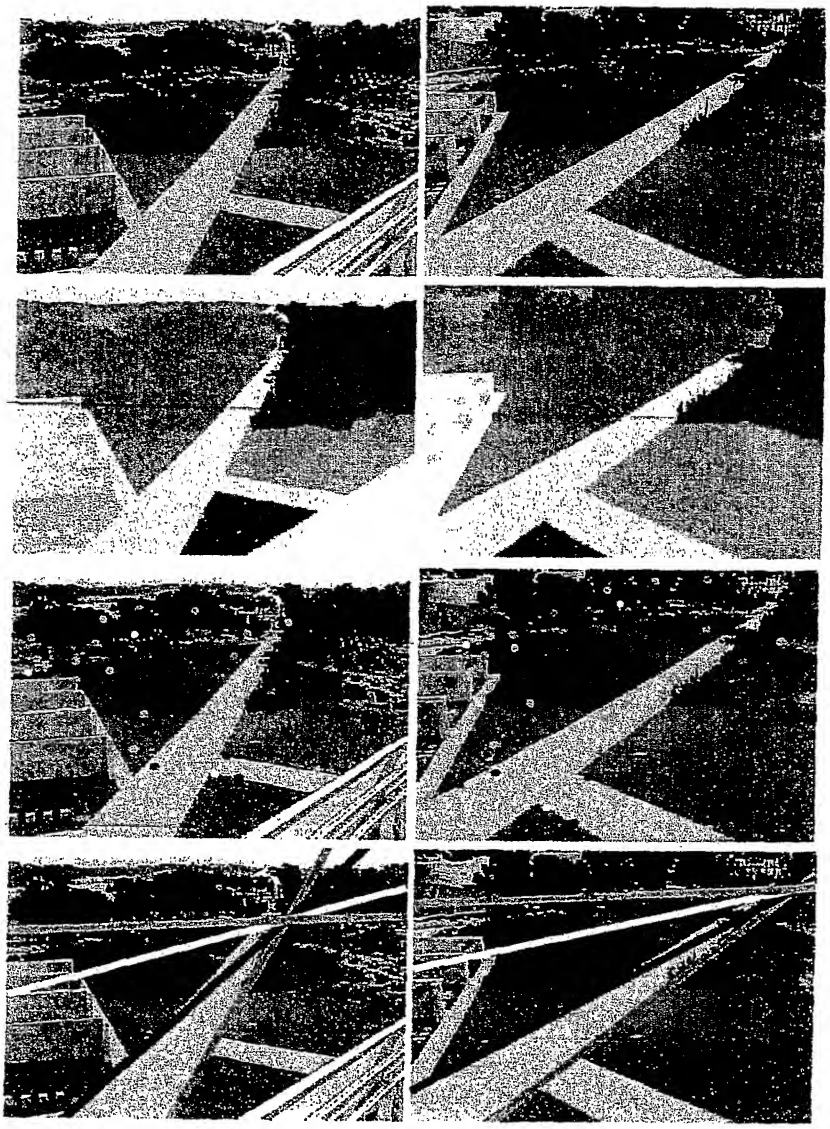


Figure 5 · Original images (top), matched aggregates (2nd row), some of the matching aggregates centroids used for RANSAC (3rd row) and epipolar lines (bottom).

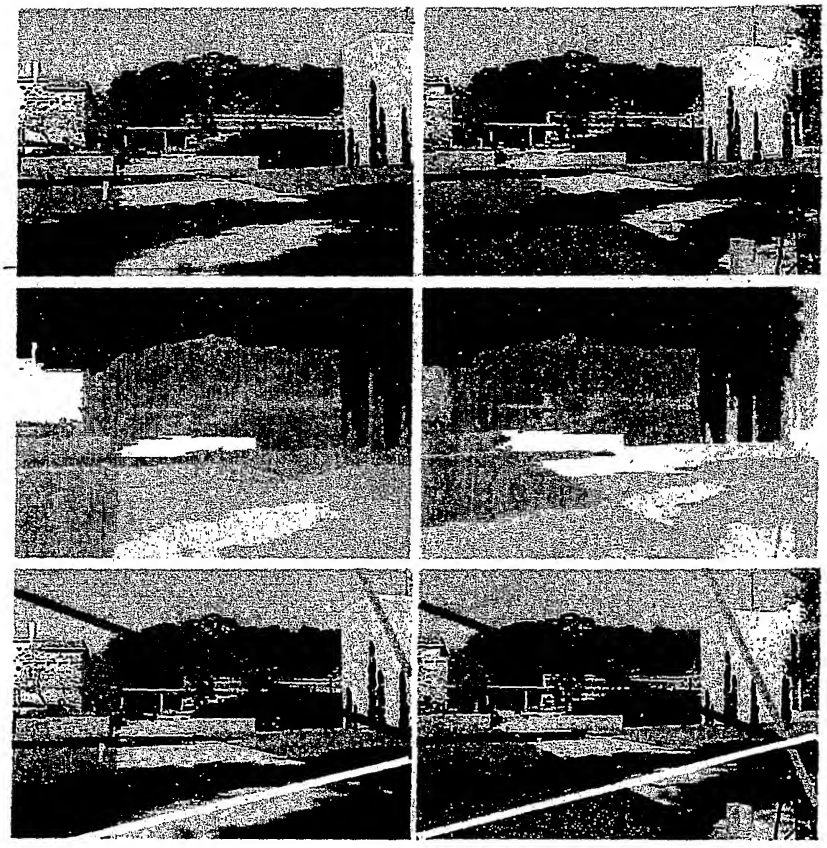


Figure 6 · Original images (top, notice the tripod at the bottom right corner), matched aggregates (middle) and epipolar lines (bottom).

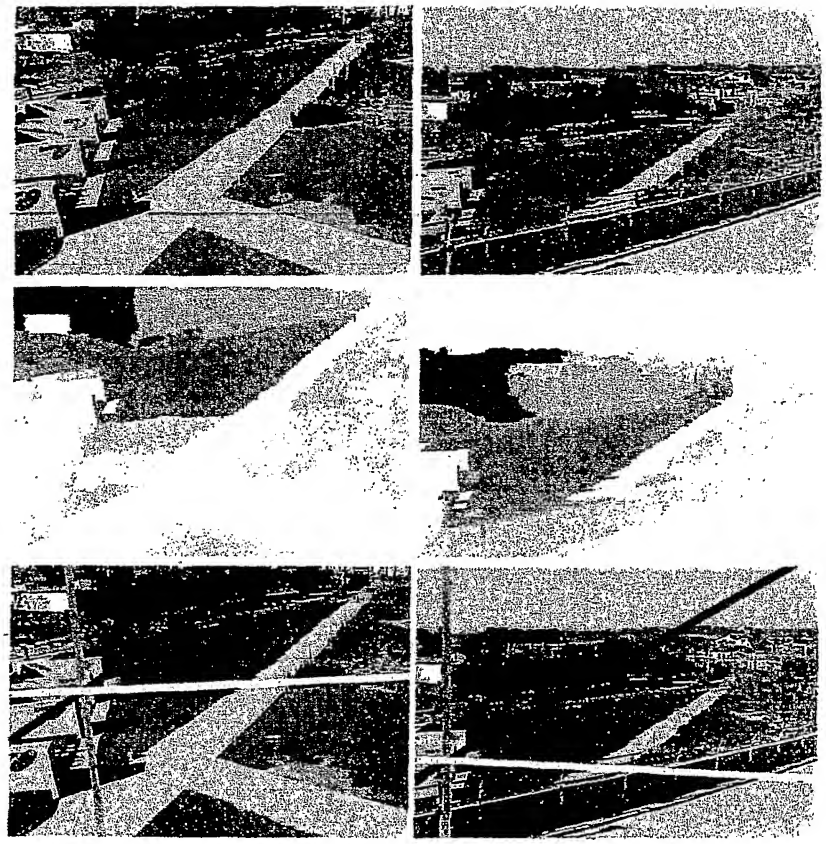


Figure 7 Original images (top, notice the tripod at the bottom left corner), matched aggregates (middle) and epipolar lines (bottom).

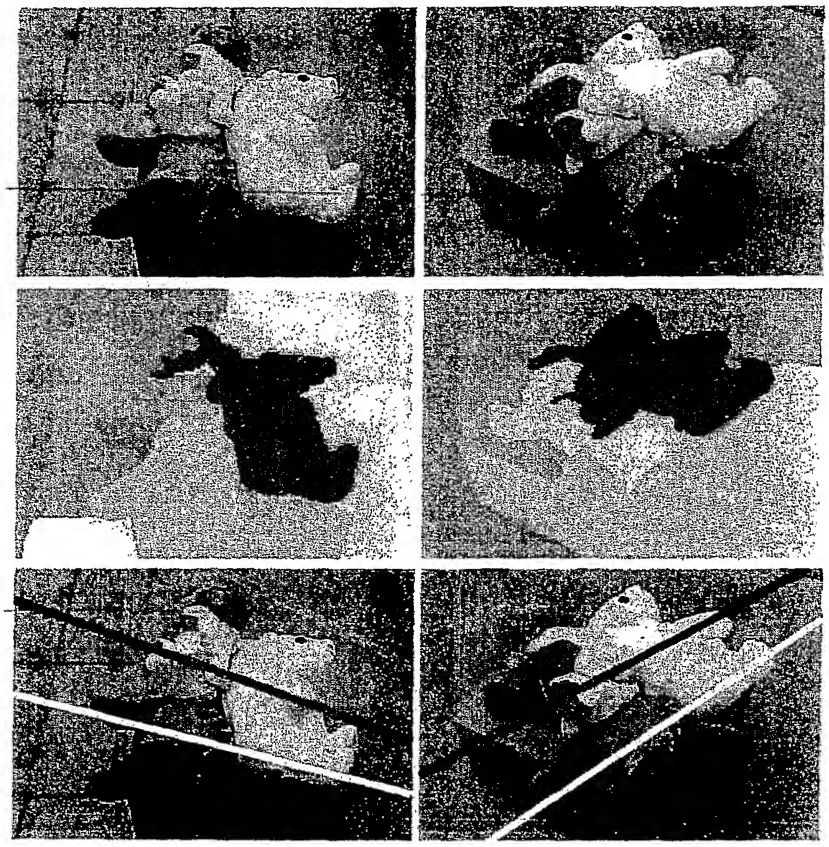


Figure 8 Original images (top), matched aggregates (middle) and epipolar lines (bottom).

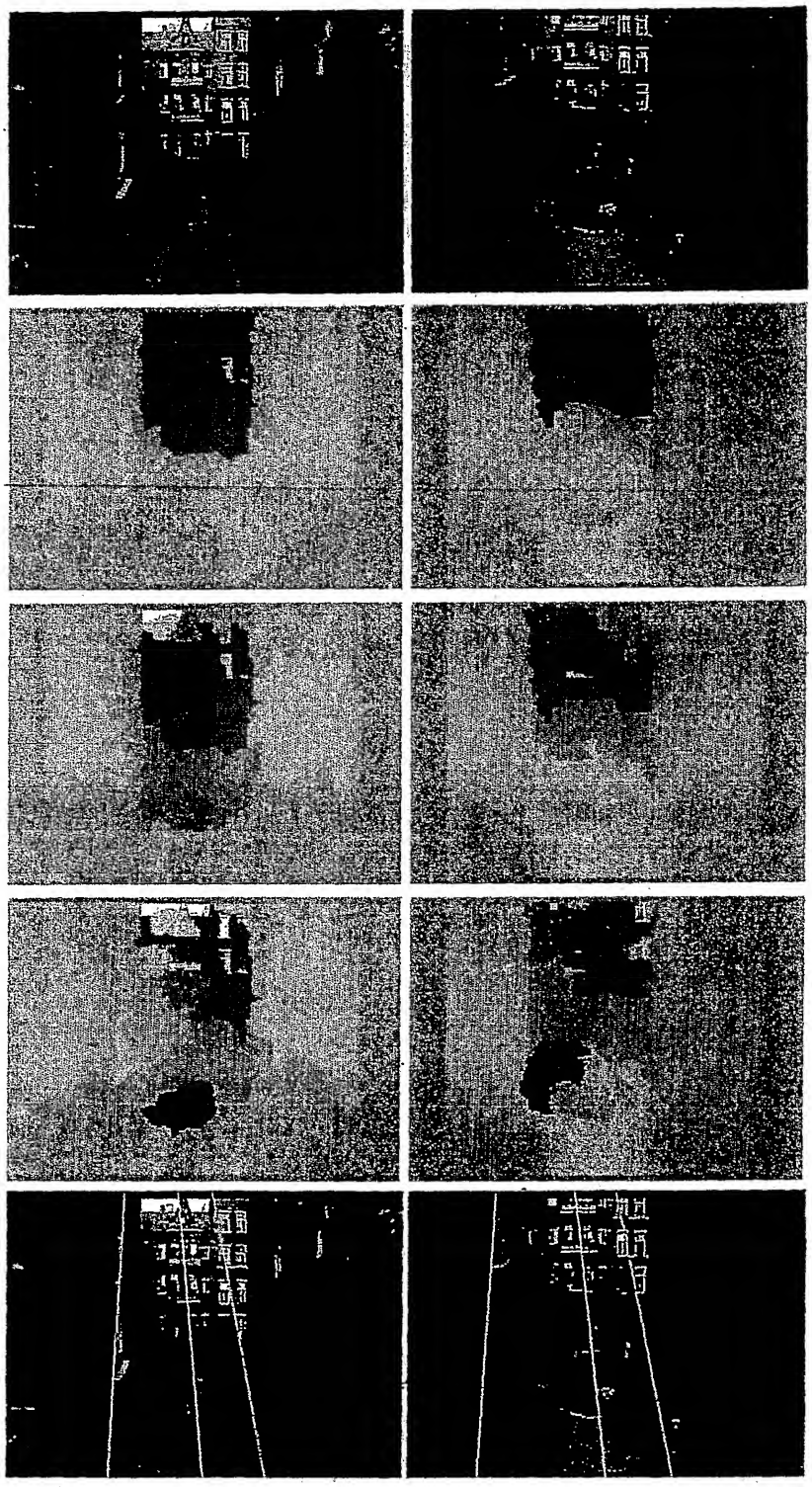


Figure 9 Original images: "Lola1", "Lola2" (top), matched aggregates in scales 10, 9 and 8 (middle) and epipolar lines (bottom).

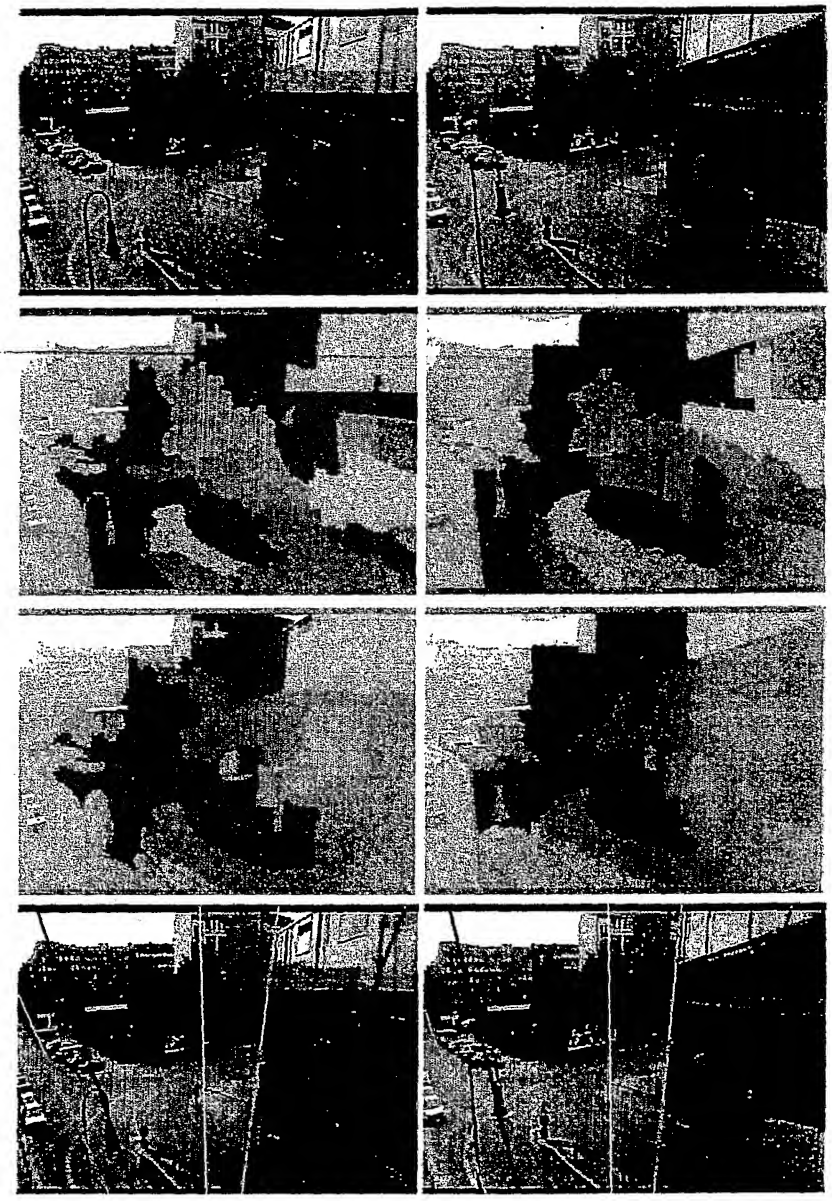


Figure .10: Original images: "Lola3", "Lola4" (top), matched aggregates in scale 9 using: fundamental matrix (2nd row), soft matching (3rd row), and epipolar lines (bottom).

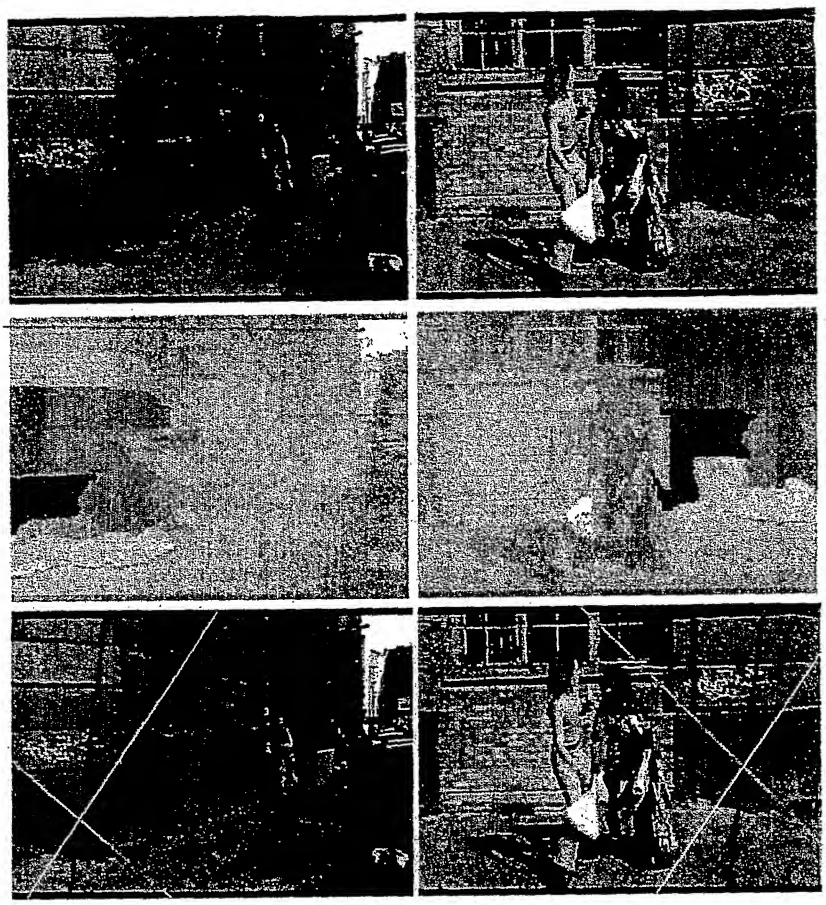


Figure .11: Original images: "Lola5", "Lola6" (top), matched aggregates in scale 9 (middle), and epipolar lines (bottom).

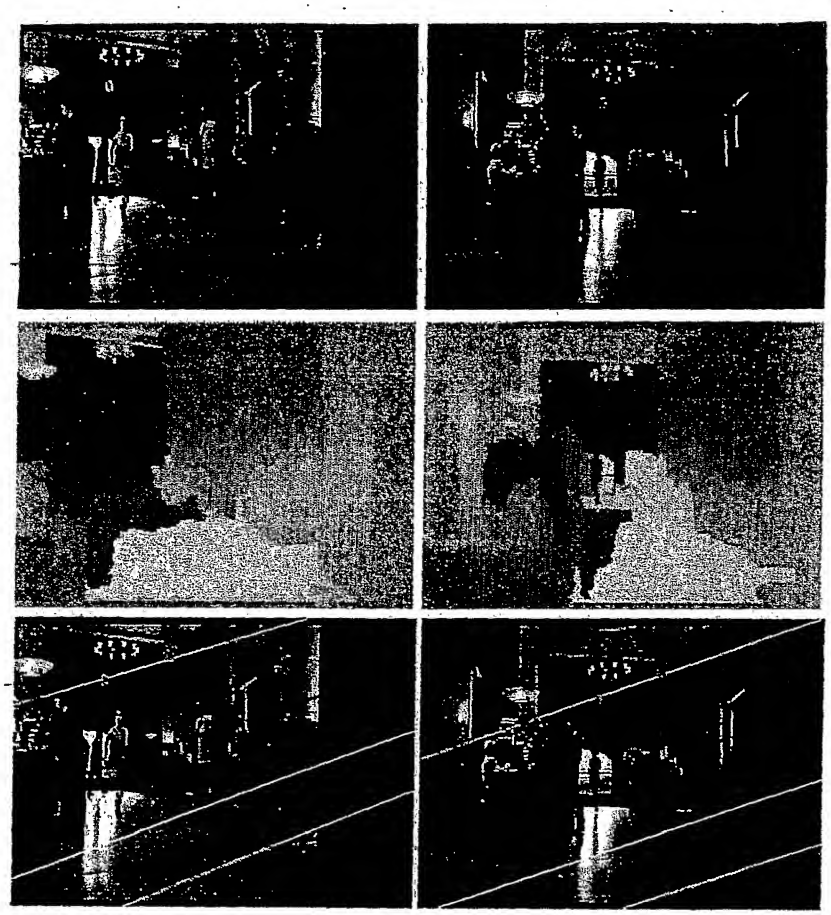


Figure 12: Original images: "Lola7", "Lola8" (top), matched aggregates in scale 9 (middle), and epipolar lines (bottom).

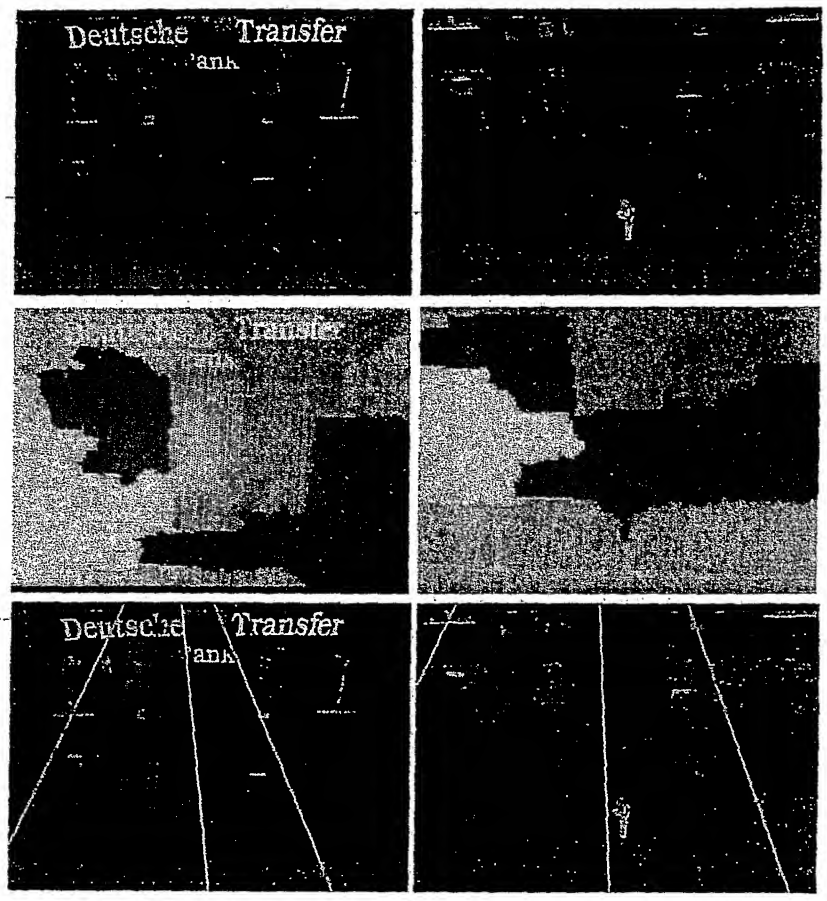


Figure 13: Original images: "Lola9", "Lola10" (top), matched aggregates in scale 10 (middle), and epipolar lines (bottom).

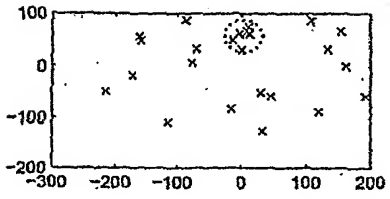


Figure 14: Disparity map of all matches found. Those of the correct matches form a compact cluster (marked by the dotted circle).

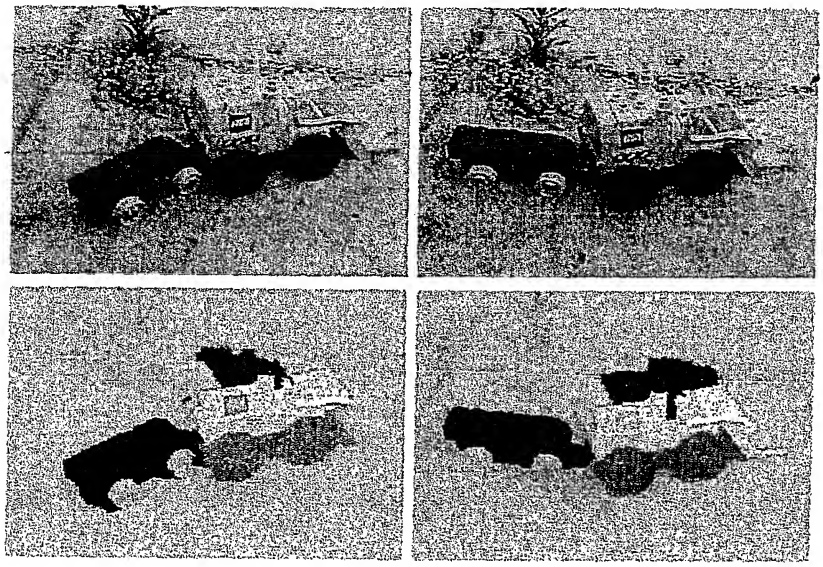


Figure 15: Original images (top) and matched aggregates (bottom).

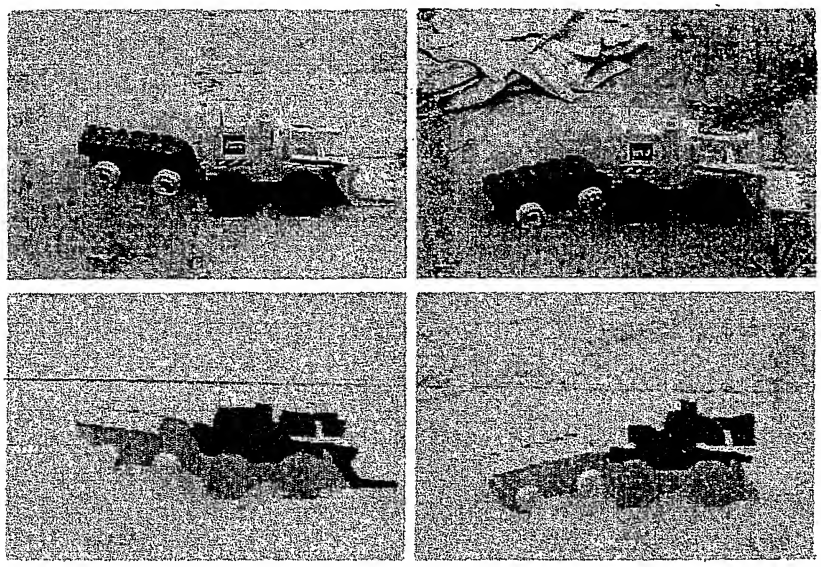


Figure 16: Original images (top) and matched aggregates (bottom).

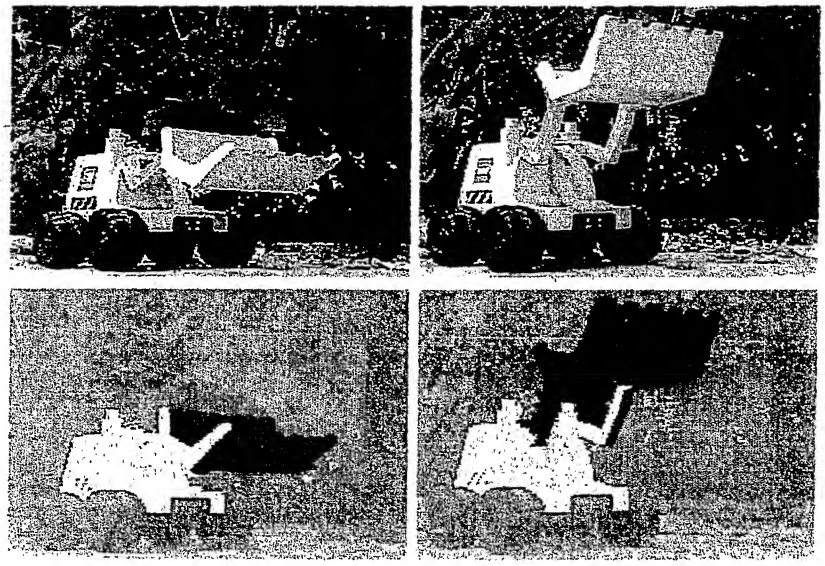


Figure 17: Original images (top) and matched aggregates (bottom).

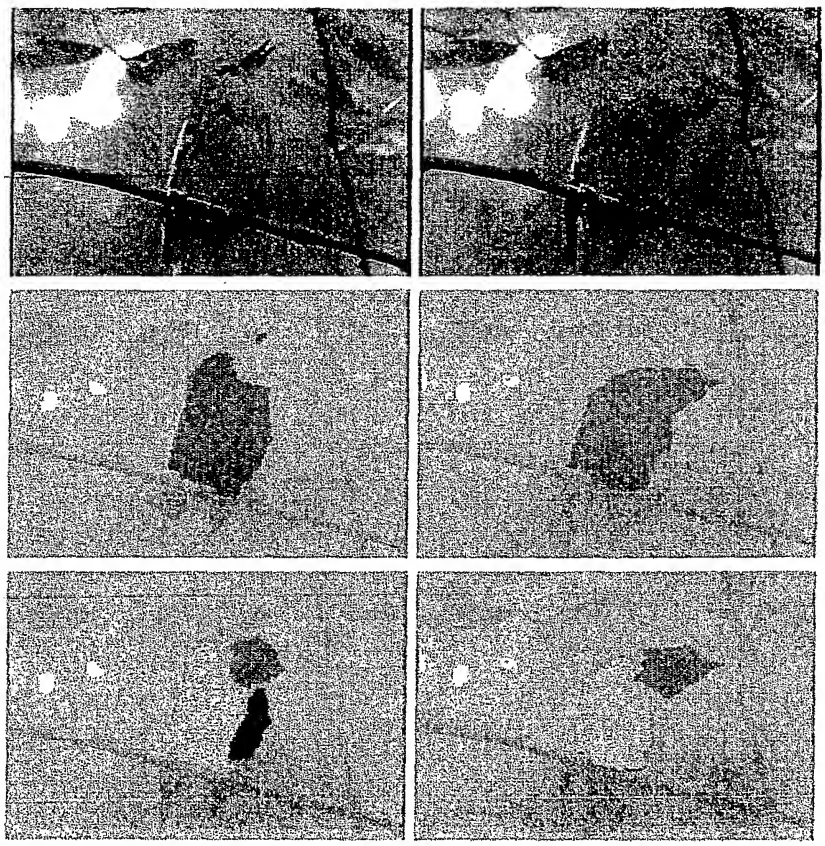


Figure 18: Original images (top), matched aggregates in scale 10 (middle) and in scale 9 (bottom).

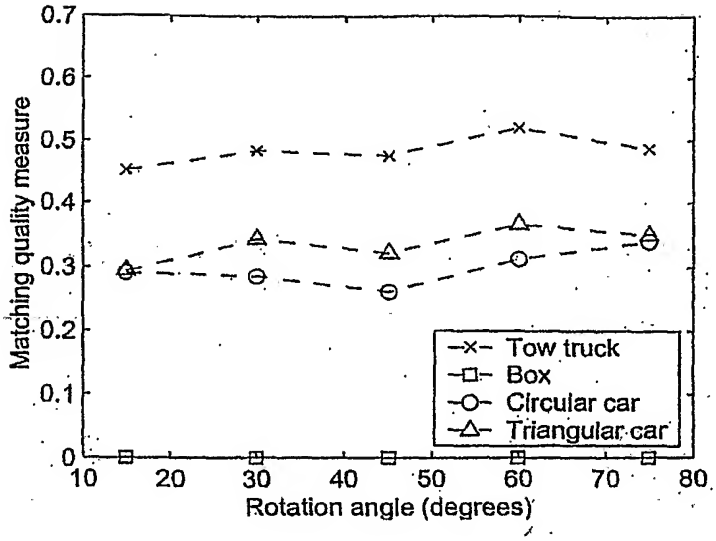


Figure 19: Quality measure for matching the regular car (A) to the other four toys.

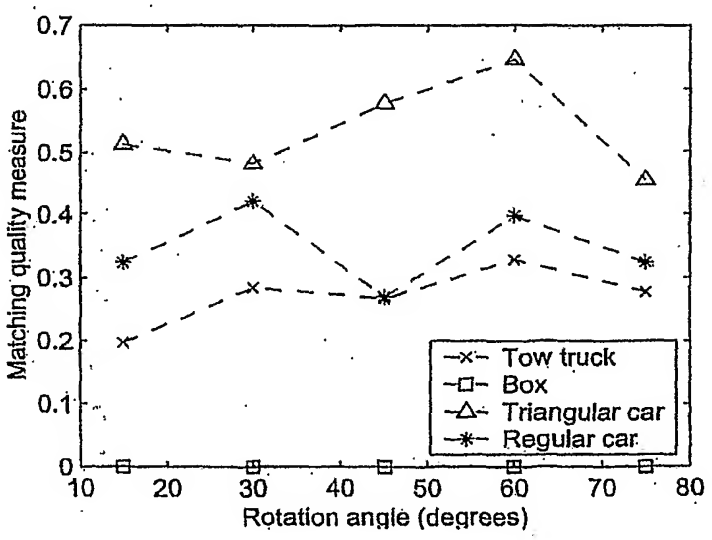


Figure 20: Quality measure for matching the circular car (B) to the other four toys.

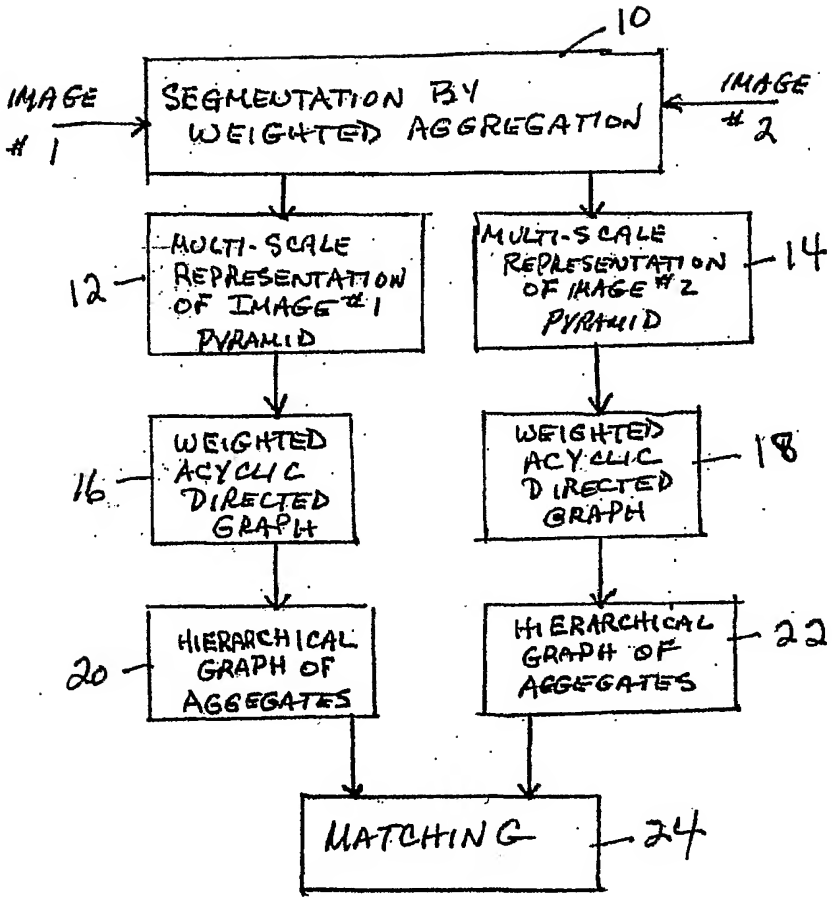

10
IMAGE # 1
SEGMENTATION BY WEIGHTED AGGREGATION
IMAGE # 2
MULTI-SCALE REPRESENTATION OF IMAGE #1 PYRAMID
12
MULTI-SCALE REPRESENTATION OF IMAGE #2 PYRAMID
14
WEIGHTED ACYCLIC DIRECTED GRAPH
16
WEIGHTED ACYCLIC DIRECTED GRAPH
18
HIERARCHICAL GRAPH OF AGGEGATES
20
HIERARCHICAL GRAPH OF AGGEGATES
22
MATCHING
24

FIGURE 21

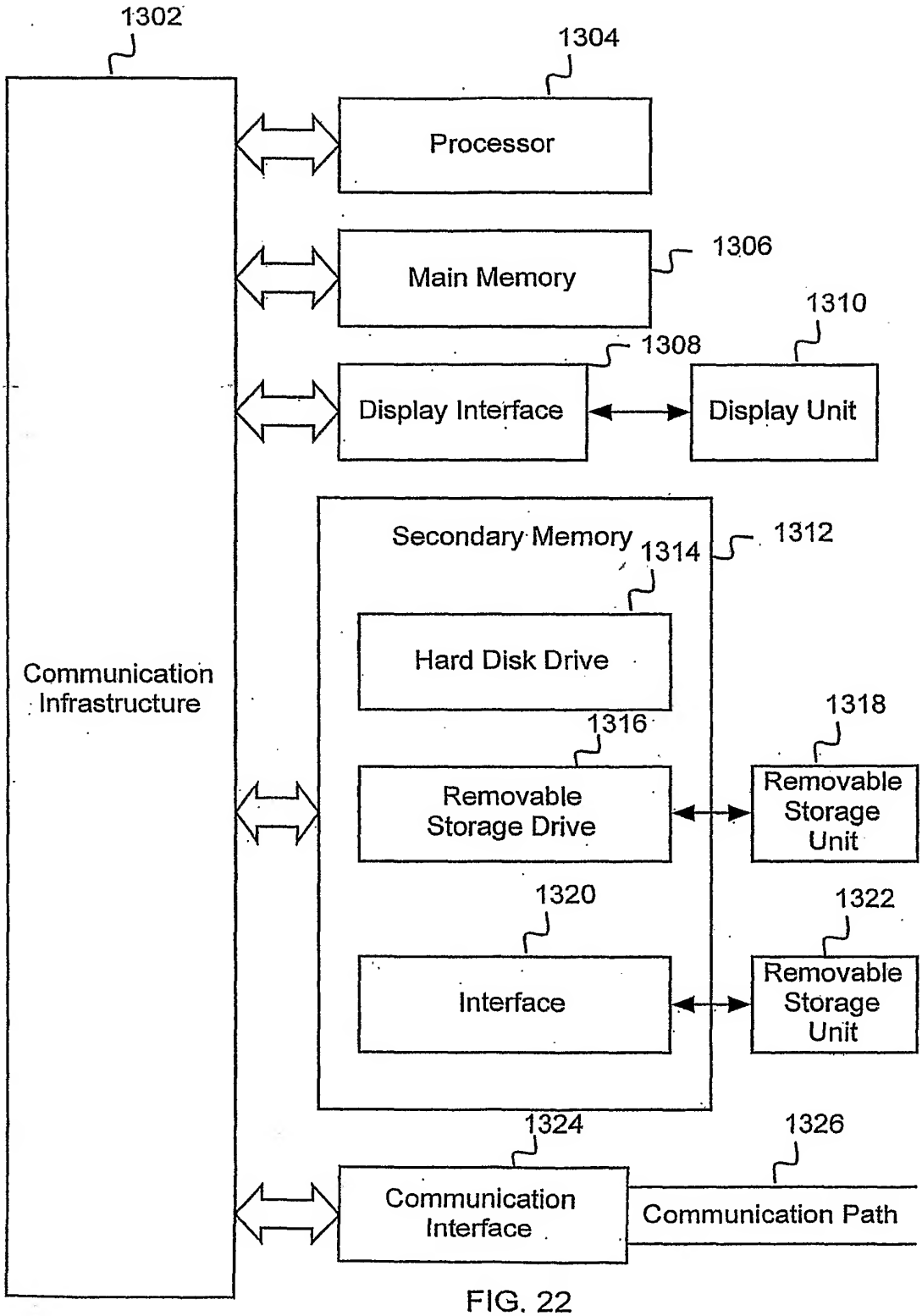

1302
1304
Processor
Main Memory
1306
1310
1308
Display Interface
Display Unit
Secondary Memory
1312
1314
Hard Disk Drive
Communication Infrastructure
1318
1316
Removable Storage Drive
Removable Storage Unit
1320
1322
Interface
Removable Storage Unit
1324
1326
Communication Interface
Communication Path

FIG. 22

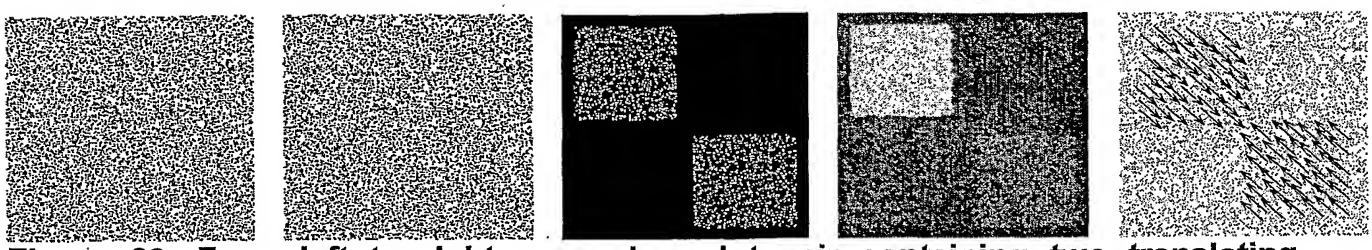


Figure 23: From left to right: a random dot pair containing two translating squares, a difference image, segmentation results obtained with our method, and motion vectors obtained from peaked aggregates at levels 4-5.

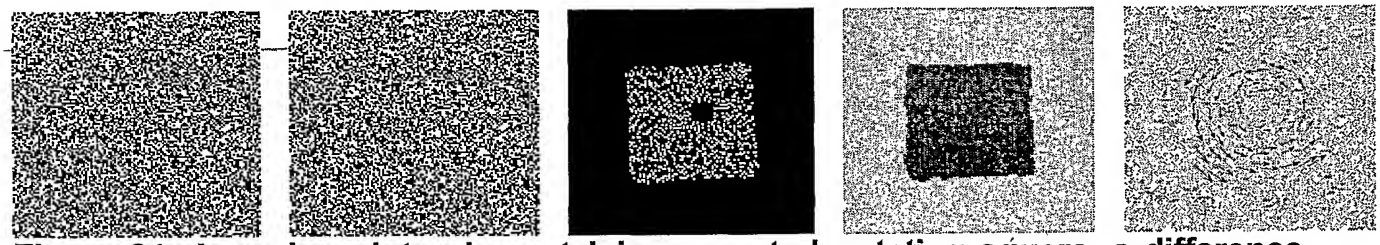


Figure 24: A random dot pair containing a central, rotating square, a difference image, segmentation results obtained with our method, and motion vectors.

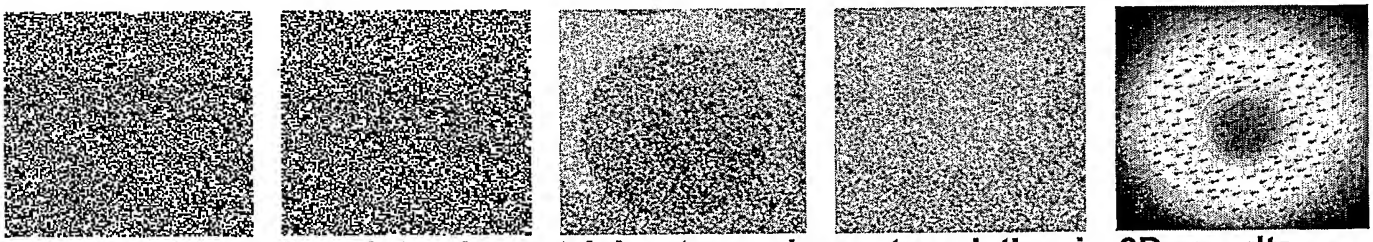


Figure 25: A random dot pair containing two spheres translating in 3D, results obtained by applying our method with affine transformation only, results obtained by applying a comparison of fundamental matrices at the coarsest levels, and motion vectors overlaid on a depth image (intensity proportional to distance from camera).

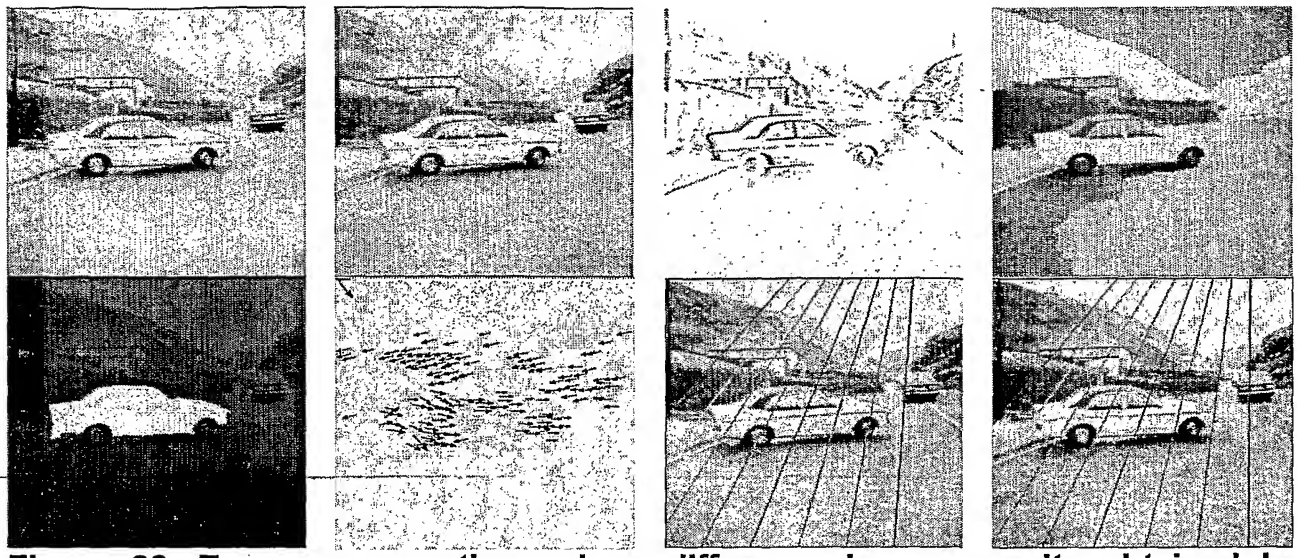


Figure 26: Top row: a motion pair, a difference image, results obtained by applying segmentation based on intensity cues alone. Bottom row: results obtained by applying our method with both motion and intensity cues, motion vectors, and epipolar lines computed for the background segment.

Figure 27: A motion pair, a difference image, results obtained by applying segmentation based on intensity cues alone, results obtained by applying our method with both motion and intensity cues, and motion vectors.

Figure 28: A motion pair, a difference image, results obtained by applying our segmentation method, and motion vectors.

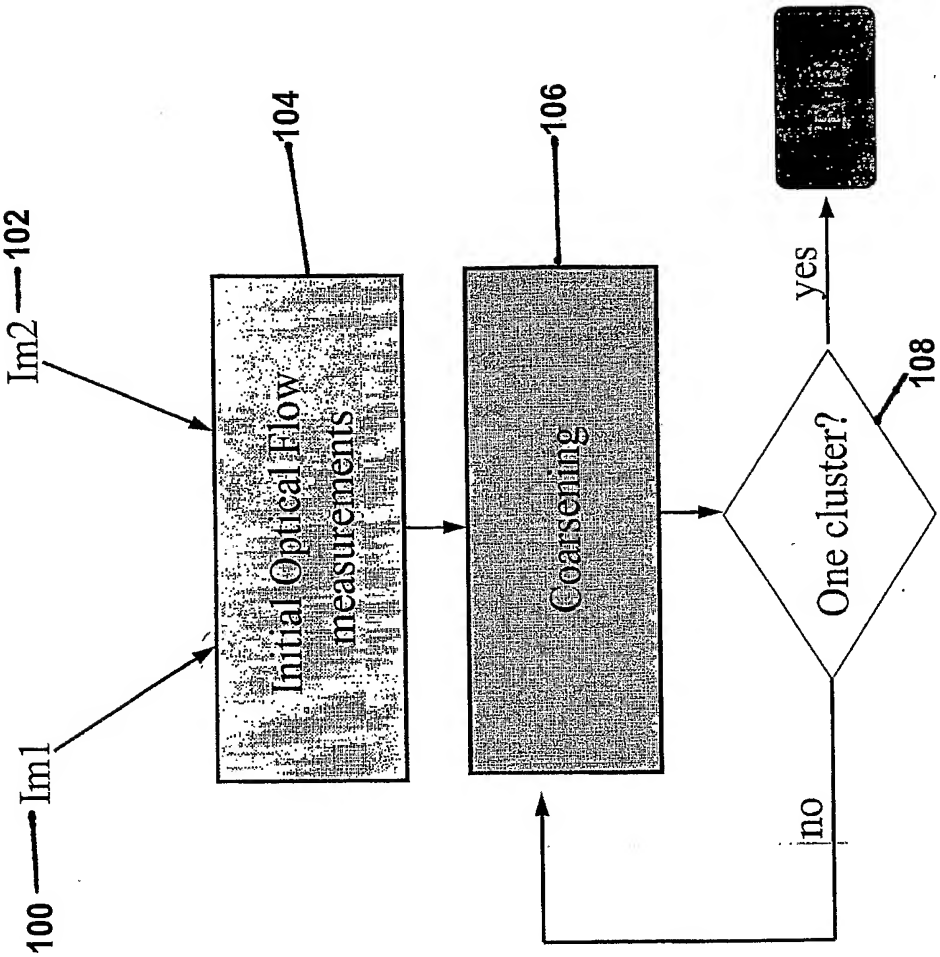
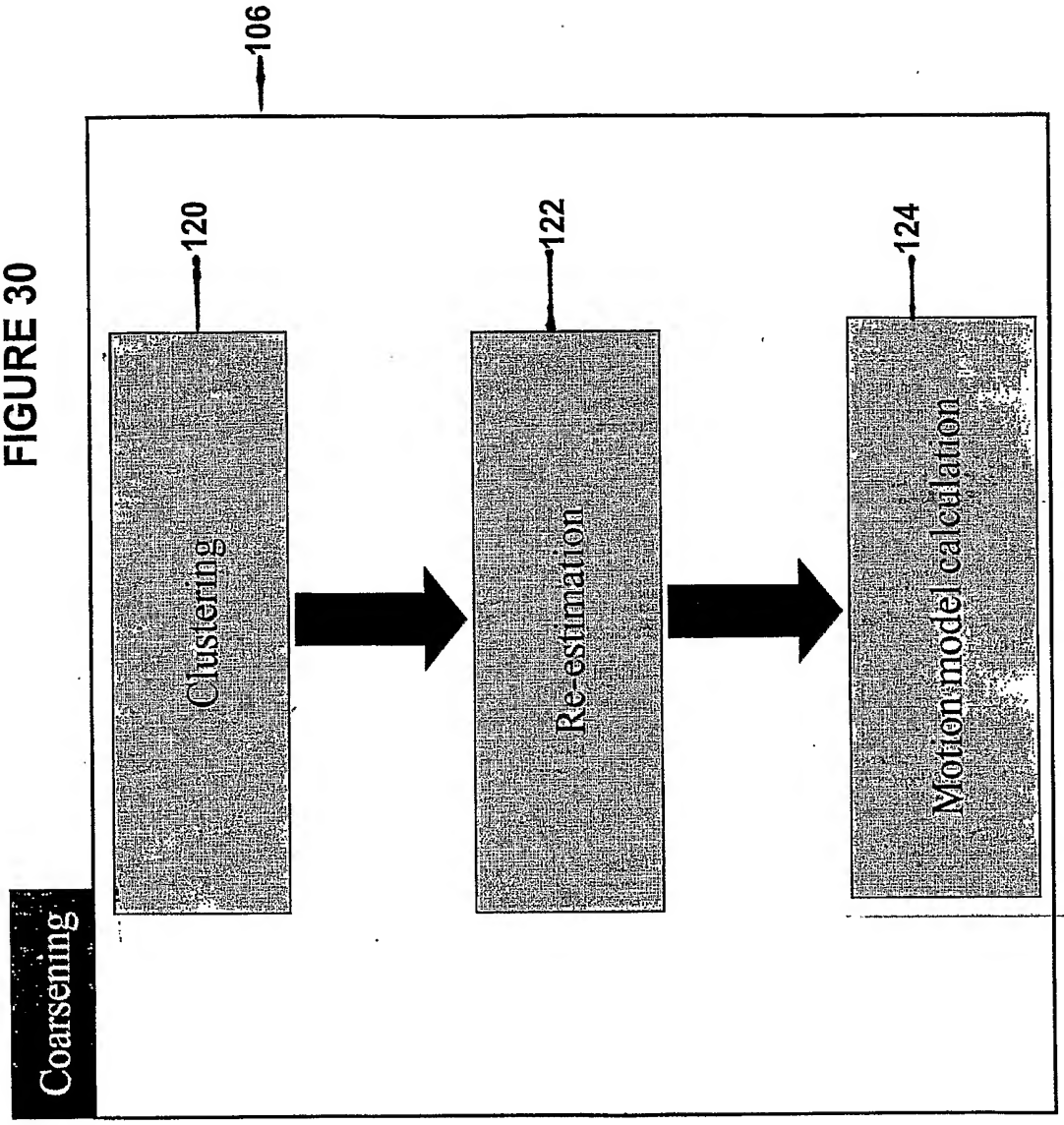

100
Im1
Im2
102
Initial Optical Flow measurements
104
Coarsening
106
One cluster?
108
yes
no

FIGURE 29

FIGURE 30


106
120
122
124
Clustering
Re-estimation
Motion model calculation
Coarsening

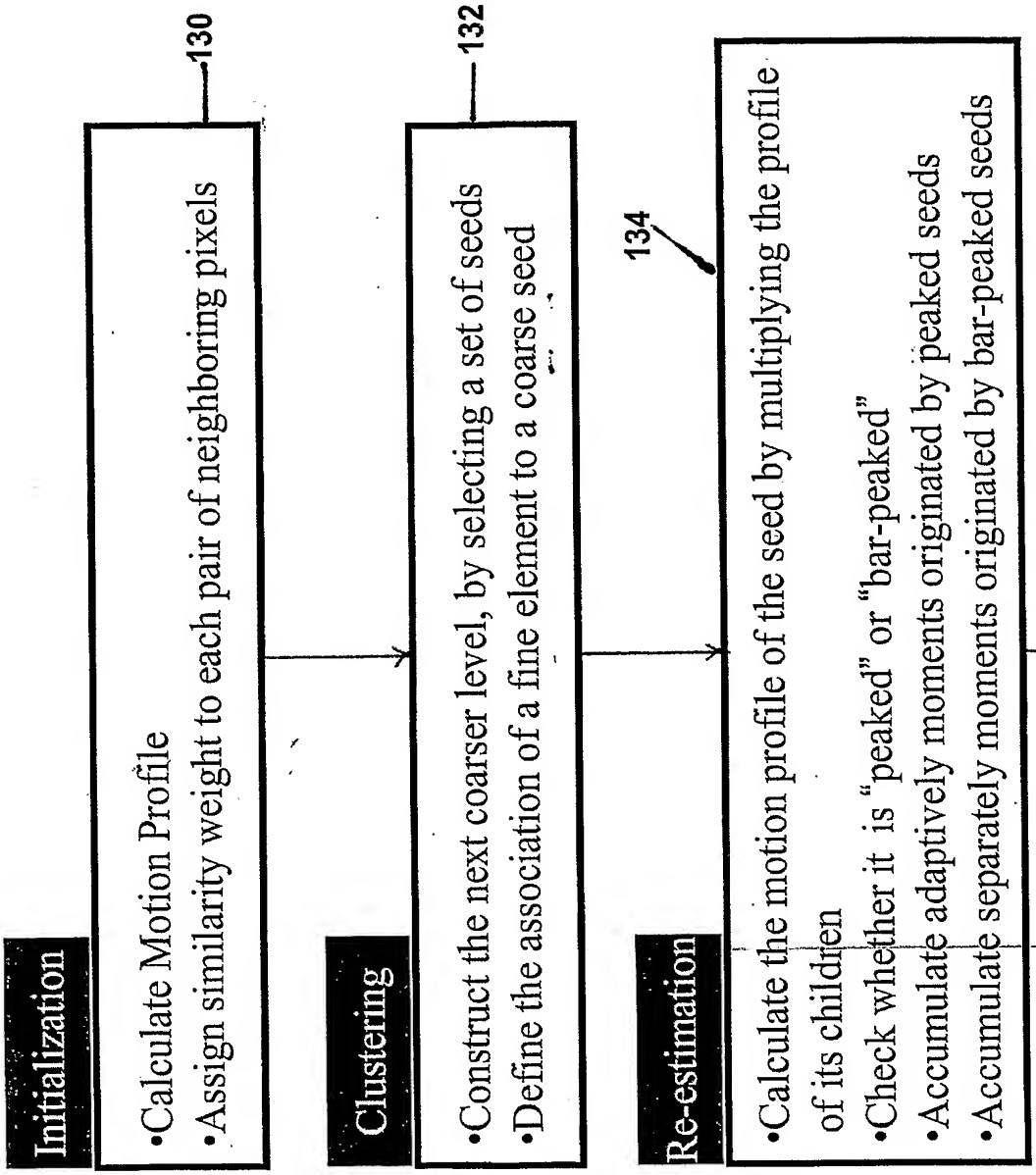

Initialization
•Calculate Motion Profile
•Assign similarity weight to each pair of neighboring pixels
130
Clustering
•Construct the next coarser level, by selecting a set of seeds
•Define the association of a fine element to a coarse seed
132
Re-estimation
134
•Calculate the motion profile of the seed by multiplying the profile of its children
•Check whether it is "peaked" or "bar-peaked"
•Accumulate adaptively moments originated by peaked seeds
•Accumulate separately moments originated by bar-peaked seeds
A

FIGURE 31a

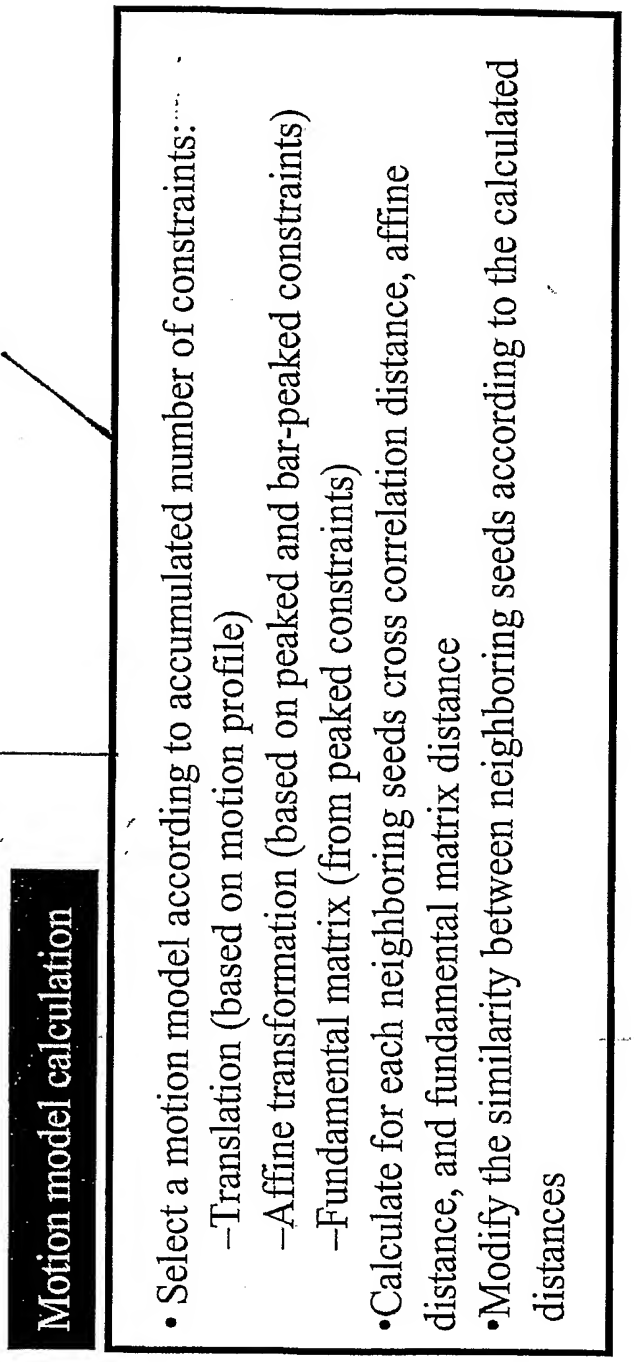

A
136
Motion model calculation
• Select a motion model according to accumulated number of constraints:
–Translation (based on motion profile)
–Affine transformation (based on peaked and bar-peaked constraints)
–Fundamental matrix (from peaked constraints)
•Calculate for each neighboring seeds cross correlation distance, affine distance, and fundamental matrix distance
•Modify the similarity between neighboring seeds according to the calculated distances

FIGURE 31b